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MS 1784-5 (2005) (English): GOOD AGRICULTURAL
PRACTICE (GAP) - PART 5: PEPPER (PIPER NIGRUM L)



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MALAYSIAN STANDARD

MS 1784: PART 5:2005

GOOD AGRICULTURAL PRACTICE (GAP) - PART 5: PEPPER (*PIPER NIGRUM* L)

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Committee representation

The Food and Agricultural Industry Standards Committee (ISC A) under whose authority this Malaysian Standard was developed, comprises representatives from the following organisations:

Department of Agriculture
Department of Standards Malaysia
Federal Agricultural Marketing Authority
Federation of Malaysian Manufacturers
Malaysian Agricultural Research and Development Institute
Malaysian Association of Standards Users
Malaysian Palm Oil Association
Ministry of Agriculture and Agro-based Industry
Ministry of Health Malaysia
Ministry of International Trade and Industry
Universiti Kebangsaan Malaysia
Universiti Putra Malaysia

The Technical Committee on Good Agricultural Practice for Crop Commodities which supervised the development of this Malaysian Standard consists of representatives from the following organisations:

Cameron Highlands Floriculturists Association
Commercial Orchid Growers Association of Malaysia
Department of Agriculture Kuala Lumpur
Department of Agriculture Sabah
Department of Agriculture Sarawak
Federal Agricultural Marketing Authority
Golden Hope Plantations Berhad
Malaysian Agricultural Research and Development Institute
Malaysian Herbal Corporation
Malaysian Palm Oil Association
Malaysian Palm Oil Board
Malaysian Rubber Board
Ministry of Agriculture and Agro-based Industry
Ministry of Health Malaysia
Ministry of Plantation Industries and Commodities
National Association of Small Holders
Persekutuan Persatuan-persatuan Pekebun-pekebun Sayur-sayuran Malaysia
SIRIM Berhad (Secretariat)
Q A Plus Asia Pacific Sdn Bhd

The Task Force on Pepper which developed this Malaysian Standard consists of representatives from the following organisations:

Department of Agriculture Sarawak
Federal Agricultural Marketing Authority
Malaysian Agricultural Research and Development Institute
Pepper Marketing Board Malaysia
State Farmers' Organisation Sarawak

FOREWORD

This Malaysian Standard was developed by the Technical Committee on Good Agricultural Practice for Crop Commodities under the authority of the Food and Agricultural Industry Standards Committee. A Task Force on Pepper was established in drafting this standard

This Malaysian Standard is intended to be used in certification schemes to recognise and certify farms which adopt Good Agricultural Practice (GAP) for the pepper in Malaysia.

The structure and presentation of this Malaysian Standard follows MS 1784:2005, *Crop commodities – Good Agricultural Practice (GAP)*. Where elements of MS 1784:2005 are not applicable to this Malaysian Standard, they are stated as such.

This Malaysian Standard consists of the following parts under the general title, Good Agricultural Practice (GAP)

- Part 2: Oil Palm (*Elaeis guineensis* Jacq.)
- Part 3: Rubber (*Hevea brasiliensis* Muell. Arg.)
- Part 4: Cocoa (*Theobroma cacao*)
- Part 5: Pepper (*Piper nigrum* L)

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations

**GOOD AGRICULTURAL PRACTICE (GAP):
PART 5: PEPPER (*Piper nigrum* L)**

1. Scope

This Malaysian Standard defines the essential elements for sustainable pepper cultivation that is legally compliant, environmentally sound, socially acceptable and economically viable to ensure quality produce that is safe and suitable for utilisation and/or consumption.

2. Normative references

The following normative references are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the normative references (including any amendments) applies.

Environment Quality Act 1974 and Environment Quality Regulations 1979

Pesticide Act 1974

Occupational Safety and Health Act 1994 and Regulations

Food Act 1983 and Food Regulations 1985

MS ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories

Workers' Minimum Standards Housing and Amenities Act 1990

3. Definitions

For the purposes of this standard, the following definitions apply.

3.1 Essential element

Critical, main or key factor.

3.2 Pepper producers

Individuals and/or companies involved in pepper commercial production. Pepper producers in this standard refer to plantation owners and small holders.

3.3 Legally compliant

Adherence to all existing national and state legislation.

3.4 Socially acceptable

Meeting and addressing issues and concerns on the welfare and safety of persons working, living in and around the farm.

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3.5 Economically viable production

Production that gives positive returns on a sustainable basis.

3.6 Sustainable crop production

A holistic, systems-oriented approach to farming that is efficient in resource management and focuses on the interrelationship of social, economic and environmental processes. This approach is based upon environmentally sound, socially responsible and economically profitable practices.

3.7 Environmentally sound

Farm practices that do not have adverse effects on the environment, e.g. chemical pollution of water ways and effluent discharge.

3.8 Quality produce

Produce that is wholesome and safe for consumption and/or suitable for utilisation.

3.9 Pests

Organisms that are capable of causing injury and loss to pepper. These organisms include insects, other invertebrates, fungi, bacteria, viruses, weeds and vertebrates.

3.10 Integrated Pest Management (IPM)

A management system that uses all suitable techniques and methods in a manner as compatible as possible to maintain pest population at levels below those causing economic injury.

3.11 Competent agriculturist

Individuals with formal training in agriculture and/or organisations with relevant expertise in pepper cultivation.

4. Requirements

4.1 Traceability

The produce shall be traceable to the farm where it has been originally produced.

4.2 Record keeping and internal audit

4.2.1 Record keeping

Farms shall keep up-to-date records. All records shall be maintained and retained for at least 3 years unless stipulated by any specific legislation. Record keeping system shall be established in which all the essential elements are captured. The records shall be accessible and audited. All farm records shall be treated as confidential.

4.2.2 Internal audit

Internal audit shall be carried out at least once a year based on the requirements of this standard. It shall be completed and documented. Corrective actions need to be implemented and documented.

4.3 Planting materials and rootstocks

4.3.1 Choice of planting materials or rootstocks should meet requirements as agreed between crop producers and customers (e.g. taste, visual appearance, shelf-life, agronomic performance, environmental impact, minimal dependence on agrochemicals).

4.3.2 The use of genetically modified planting materials shall be avoided unless expressed permission has been given by the relevant authorities and should comply with existing regulations in the country of the final consumers.

4.3.3 The planting of genetically modified organism (GMO) shall be agreed between crop producers and customers before planting.

4.3.4 The quality of the planting materials including rootstock should be known before use and a record of the variety name, variety purity, and vendor should be kept. Where available, planting material certification records should be retained.

4.3.5 Planting materials should be taken from farms that have parent vines that are:

- a) of recommended varieties;
- b) preferably not more than 3 years old;
- c) healthy and vigorous;
- d) free from pests and diseases; and
- e) having abundant adventitious roots.

4.3.6 Where protected varieties are used, the farm shall respect intellectual property right legislation on plant variety protection.

4.3.7 Varieties used for planting in the farm should preferably possess resistance or tolerance to major pests and diseases, so as to minimise utilisation of pesticide.

4.4 Site history and site management

4.4.1 Site history

4.4.1.1 A recording system shall be established for the site history and the layout of fields of their crop history.

4.4.1.2 For all new planting sites, a risk assessment should be carried out by a competent agriculturist, taking the following into account:

- a) prior use of the land;
- b) potential impacts of the production on adjacent crops and areas; and

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- c) potential impact of activities carried out at adjacent areas.

The information of the risk assessment shall be recorded.

4.4.1.3 All new farms shall not be located more than 1 000 m above sea level.

4.4.1.4 All new farms should not be cultivated on land more than 25 ° slope unless as specified by local legislation.

4.4.2 Site management

4.4.2.1 The farm management shall demonstrate that it has legal rights to the cultivation of the land and all necessary regulatory approvals.

4.4.2.2 Where pepper is grown on sloping land (within the permissible level), appropriate soil conservation measures, such as the use of leguminous cover crop in the inter-rows of pepper vines, shall be undertaken to prevent soil erosion and silt deposition into drains, waterways, etc.

4.4.2.3 A visual identification or reference system for each field shall be established.

4.5 Soil and substrate management

4.5.1 Soil type mapping

4.5.1.1 Soil map should be prepared for the farm to facilitate infrastructure planning, land preparation, inter-cropping, livestock integration and replanting programmes.

4.5.1.2 Topography map should be used to assist land clearing, preparation and planting.

4.5.2 Cultivation

4.5.2.1 Cultivation practices proven to improve or maintain soil structure and to avoid soil compaction should be followed.

4.5.2.2 The planting of leguminous cover crop in the inter-rows of pepper vines is greatly encouraged on gentle slopes. The use of leguminous plants as living support for pepper vines is also strongly encouraged as shade from such support reduces the incidence of black berry disease.

4.5.2.3 If living support is used, it shall be pruned regularly and the pruned materials left on the pepper mounds for nutrient recycling.

4.5.3 Soil erosion

Field cultivation techniques that minimise soil erosion shall be adopted.

4.5.4 Soil fumigation

4.5.4.1 Where chemical fumigation of soils is carried out, it shall be justified and recorded.

4.5.4.2 Alternative methods such as use of disease resistant cultivars, thermal or solar sterilisation and similar techniques shall be explored before resorting to use of chemical fumigants.

4.5.5 Substrates

4.5.5.1 Preference should be given to the use of natural substrates such as soil.

4.5.5.3 Where chemicals are used to sterilise substrates for reuse, records shall be kept and shall contain location of sterilised substrates. Steaming should be the preferred option of sterilisation.

4.6 Fertiliser management (organic and inorganic)

4.6.1 Nutrient requirement

4.6.1.1 Management practices should take into consideration the soil types to ensure nutrient balances and minimise nutrient loss.

4.6.1.2 Fertiliser rates should be based on crop requirement and nutrient levels of soil and leaf.

4.6.2 Fertiliser utilisation

4.6.2.1 Usage of fertilisers should be in accordance with science based recommendations or best developed practice.

4.6.2.2 The type, quantity, method, timing and frequency of fertiliser application should be carefully observed so as to maximise benefits and minimise losses.

4.6.3 Records of application

All applications of soil and foliar fertilisers shall be recorded. Records shall include location, date of application, type and quantity of fertiliser applied, the method of application and name of operator.

4.6.4 Application machinery

Fertiliser application machinery shall be kept in good working condition and calibrated to ensure the correct quantity is applied.

4.6.5 Fertiliser source and storage

4.6.5.1 Fertiliser stock records shall be kept up-to-date and made available for inspection.

4.6.5.2 Fertilisers should not be stored in the same room with pesticides. If this is not possible, the fertilisers and the pesticides shall be physically separated and labelled accordingly.

4.6.5.3 Fertilisers shall be stored in a covered, clean, dry location where there is no risk of contamination of water sources.

4.6.5.4 Fertilisers shall not be stored with nursery stock.

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4.6.5.5 Fertilisers shall not be stored with fresh produce.

4.6.5.6 All hazard and risk areas to human shall be clearly indicated.

4.6.5.7 Record of source and chemical content of fertiliser used shall be made available.

4.6.6 Organic fertiliser

4.6.6.1 Organic fertiliser should be stored and handled in an appropriate manner to reduce the risk of contamination of the environment.

4.6.6.2 The use of untreated and treated human sewage sludge and pig waste is prohibited.

4.6.6.3 To avoid pollution by heavy metals or by nitrate leaching, analysis of nutrients, heavy metals and other potential pollutants in the organic fertiliser should be completed before application. Proper account shall also be taken of the nutrient contribution of organic fertilisers.

4.6.6.4 Organic fertilising in open field cultivation should be based on nutrient management plans.

4.6.6.5 Source of organic fertiliser used shall be recorded.

4.7 Irrigation and fertigation

4.7.1 Planning

Pepper producers are recommended to base their irrigation or fertigation requirement on sound historical and scientific data.

4.7.2 Method

4.7.2.1 The most efficient and commercially practical water delivery system should be used to ensure the best utilisation of nutrient and water resources as well as to protect water sources and avoidance of pollution..

4.7.2.2 Consideration should be given to a water management plan to optimise water and nutrient usage and reduce wastage (e.g. systems for reuse, application at night, maintenance of equipment to reduce leakage, collection of rainwater, etc.).

4.7.2.3 All pepper producers are encouraged to maintain records of irrigation and fertigation water usage.

4.7.3 Quality of water

4.7.3.1 Untreated sewage water is prohibited for use.

4.7.3.2 Based on risk assessments, water sources should be analysed at least once a year for microbial, chemical and mineral pollutants. The analysis results should adhere to the Environment Quality Act 1974 and Environment Quality Regulations 1979 and adverse results acted upon.

4.7.4 Supply of water

Water should be derived from sustainable sources. Pepper producers are encouraged to seek advice from relevant authorities e.g. local Drainage and Irrigation Department (DID), on water sourcing.

4.8 Crop protection

4.8.1 Basic elements of crop protection

4.8.1.1 The use of pesticides to protect the crop shall be minimised.

4.8.1.2 Wherever possible, pepper producers shall apply recognised Integrated Pest Management (IPM) techniques. Non-chemical control measures are preferred over chemical treatments.

4.8.1.3 Pepper producers are encouraged to seek advice on IPM from competent authorities.

4.8.2 Choice of chemicals

4.8.2.1 The crop protection product utilised shall be appropriate for the control required.

4.8.2.2 Pepper producers shall only use chemicals that are officially registered under the Pesticides Act 1974.

4.8.2.3 Selective products that are specific to the target pest and which have minimal effect on populations of beneficial organisms, aquatic life, workers and consumers and are not detrimental to the ozone layer should be used.

4.8.2.4 Instructions on the label shall be followed to ensure effective application and to avoid risks to operators, consumers and the environment.

4.8.2.5 An anti-resistance strategy should be adopted to avoid reliance on any one chemical.

4.8.2.6 Pepper producers shall not use chemicals that are banned or disallowed in importing countries.

4.8.2.7 Pepper producers should consult their customers to determine if any additional commercial restrictions exist.

4.8.3 Advice on pesticide usage

Pepper producers are encouraged to seek advice on pesticide usage from competent authorities.

4.8.4 Records of application

All records of pesticides applications of pesticide shall include crop name, any intercrop and animal integration, location, date of application, reason for application, trade name of pesticide used, dosage, method of application and name of operator.

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4.8.5 Safety, training and instructions

4.8.5.1 Operators shall be trained on safe and proper use of pesticides.

4.8.5.2 Each area of application should be field marked with appropriate warning sign.

4.8.6 Personal clothing and equipment

4.8.6.1 Operators shall be equipped with suitable personal protective clothing and equipment appropriate to the danger posed to health and safety in accordance to the Occupational Safety and Health Act 1994 and Regulations.

4.8.6.2 Personal protective clothing and equipment shall be cleaned after use and stored separately from pesticides.

4.8.7 Pre-harvest interval

Pre-harvest intervals as prescribed on pesticide labels shall be strictly adhered to.

4.8.8 Spray equipment

4.8.8.1 Spray equipment shall be suitable for use in pepper and shall be kept in good working condition. Calibration should be carried out as and when necessary to ensure accurate delivery of the required quantity of spray.

4.8.8.2 When mixing chemicals, the correct quantity of spray mix and the proposed treatment type shall be calculated, accurately prepared and recorded.

4.8.9 Disposal of surplus spray mix

Surplus spray mix and tank washings should be sprayed over an untreated part of the crop as long as the recommended dosage has not been exceeded or on designated fallow land. Records should be kept of such spraying.

4.8.10 Pesticide storage

4.8.10.1 Pesticides shall be stored in accordance with local regulations.

4.8.10.2 Pesticides shall be stored in a sound, secured, water resistant, well ventilated and well-lit location away from other materials.

4.8.10.3 All shelves should be of non-absorbent material.

4.8.10.4 The pesticide store shall be able to retain spillage (e.g. to prevent contamination of water courses).

4.8.10.5 There shall be adequate facilities for measuring and mixing pesticides.

4.8.10.6 There shall be emergency facilities (e.g. plenty of clean water, bucket of sand) to deal with contamination and accidental spillage.

4.8.10.7 Keys and access to the store shall be limited to workers with adequate training in the handling of pesticides.

4.8.10.8 A procedure to handle accidents, including a list of contact telephone numbers and the location of the nearest telephone shall be available within the immediate vicinity of the store. Similar information shall also be available next to the designated telephone.

4.8.10.9 An inventory of the pesticide store shall be kept and be readily available for inspection.

4.8.10.10 All pesticides shall be stored in their original package.

4.8.10.11 Only pesticides registered for use on pepper or other crops on the farm shall be stored.

4.8.10.12 Powders shall be stored on shelves above liquids or separately.

4.8.10.13 Warning signs of potential dangers shall be placed on access doors.

4.8.11 Empty pesticide containers

4.8.11.1 Empty pesticide containers shall not be reused and the disposal of empty pesticide containers shall be in a manner that avoids exposure to humans and contamination of the environment.

4.8.11.2 Official collection and disposal systems should be used if available.

4.8.11.3 Empty containers shall be rinsed at least three times with water, and the washings returned to the spray tank before disposing.

4.8.11.4 Unless participating in established recycling programmes or with expressed permission from the authorities, rinsed containers shall be pierced to prevent reuse.

4.8.11.5 Empty containers shall be kept secure until disposal is possible.

4.8.11.6 Disposal or destruction of containers shall be in accordance to the Pesticides Act 1974 and/or any other relevant local regulations.

4.8.12 Obsolete pesticides

Obsolete pesticides shall only be disposed through an approved chemical waste contractor.

4.9 Harvesting

4.9.1 Hygiene

4.9.1.1 Hygiene protocol should be put in place in order to prevent physical, microbiological and chemical contamination for workers.

4.9.1.2 Workers shall undergo training in basic hygiene and food safety before handling fresh berries. They shall be made aware of the requirement to notify management should they contract any transferable diseases, which may render them unfit to work in the vicinity of produce destined for human consumption.

4.9.1.3 Workers should have access to clean toilet and washing facilities.

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4.9.2 Packaging on farm

Not applicable.

4.10 Post-harvest handling

4.10.1 Post-harvest treatment

4.10.1.1 Use of chemical post-harvest treatments should be minimised. When used, it shall be in accordance with product label or established recommendations.

4.10.1.2 When chemicals are used, they shall be in accordance with the relevant legislation including Food Act 1983 and Food Regulations 1985. In addition, where pesticides are involved, they shall be officially registered under the Pesticides Act 1974.

4.10.1.3 Pepper producers should not use chemicals that are banned or disallowed in importing countries and consult the relevant authorities to determine if any additional commercial restrictions exist.

4.10.1.4 Pepper producers should be able to demonstrate their competence and knowledge with regard to the post-harvest treatment.

4.10.1.5 Records for all post-harvest treatments shall be kept to include crop name, location, date of treatment, reason for treatment, type of post-harvest treatment, dosage, methods of treatment and name of operator.

4.10.2 Post-harvest washing

4.10.2.1 Clean water shall be used for washing of produce.

4.10.2.2 Based on risk assessment source of water for post-harvest washing should be analysed at least once a year for microbial, chemical and mineral pollutants.

4.10.3 Processing and drying

4.10.3.1 Pepper berries for making white pepper should be processed by soaking in clean water or by other suitable means.

4.10.3.2 For making black pepper, the berries should be de-stalked and dried.

4.10.3.3 Black and white peppercorns should be dried on a clean surface under the sun or by any other drying process to reduce moisture content to less than 16 %.

4.10.3.4 Fresh berries for making green pepper should be de-stalked and washed in clean water.

4.11 Pesticide residue analysis of produce

4.11.1 The frequency of pesticide residue analysis shall be based on risk assessment taking into consideration its intended use.

4.11.2 Pepper producers shall provide evidence of residue testing.

4.11.3 The test results should be traceable to the crop producer and to the production site.

4.11.4 The laboratories used for residue testing shall be accredited by a competent accreditation authority to good laboratory standards (e.g. ISO/IEC 17025).

4.11.5 Preventive and corrective action plans shall be in place in the event a maximum residue level (MRL) is exceeded.

4.12 Waste and pollution management, recycling and reuse

4.12.1 All possible waste products and sources of pollution should be identified in all areas of pepper production.

4.12.2 Having identified wastes and pollutants, a plan should be developed and implemented, to avoid or reduce wastage and pollution. Whenever possible, avoid land filling or burning, by recycling the waste. Crop debris may be composted and reused for soil conditioning.

4.13 Worker health, safety and welfare

4.13.1 Action plan

There should be an action plan to promote safe and good working conditions.

4.13.2 Training

4.13.2.1 Training shall be given to workers operating dangerous or sophisticated equipment.

4.13.2.2 Records of training for each employee shall be kept.

4.13.2.3 Accident and emergency procedures with clear instructions in the appropriate language of the workforce shall be displayed to all workers.

4.13.3 Facilities and equipment

4.13.3.1 First aid boxes shall be available at designated sites and all workers should be informed of these locations and the personnel in charge.

4.13.3.2 Hazards should be clearly identified by appropriate warning signage.

4.13.4 Pesticide handling

Workers undertaking pesticide applications on the farm should receive health checks in line with the Occupational Safety and Health Act 1994 and Regulations and Pesticides Act 1974.

4.13.5 Hygiene

4.13.5.1 All permanent product packing and storage sites shall have adequate pest control measures, particularly in areas for food handling, storage of packaging, storage of pesticides and storage of fertilisers.

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4.13.5.2 Workers should receive basic training in cleanliness requirements. The training program should outline the need for general safety.

4.13.5.3 The premises should be kept clean at all times to avoid establishing a breeding ground for pests.

4.13.6 Welfare

4.13.6.1 All employment conditions shall comply with relevant regulations.

4.13.6.2 If on-site living quarters are provided, they shall be habitable and have basic amenities and facilities in compliance with Workers' Minimum Standards Housing and Amenities Act 1990.

4.14 Environmental issues

4.14.1 Impact of farming on the environment

Pepper producers shall conform to Environmental Quality Act 1974 and Regulations which covers the concern for air, water, soil, biodiversity and other environmental issues.

4.14.2 Wildlife and biodiversity conservation

4.14.2.1 Pepper producers should always be conscious of the need to conserve biodiversity, wildlife, high conservation value areas and the enhancement of agricultural biodiversity.

4.14.2.2 Where Environmental Impact Assessment (EIA) is required, consideration for the conservation of biodiversity and wildlife shall include the following areas:

- a) a baseline audit to understand existing animal and plant diversity on the farm;
- b) action to avoid damage and deterioration of habitats on the farm; and
- c) an action plan to enhance habitats and increase biodiversity, in particular agricultural biodiversity on the farm.

4.14.3 Unproductive sites

Pepper producers are encouraged to convert unproductive sites (e.g. swamps, steep slopes, deep peat etc) into conservation areas for natural flora and fauna.

4.15 Record of complaints

Records of complaints on pepper produce not in compliance with requirements in this standard and their remedial actions shall be made available on site.

5. Legal requirements

All farm activities and produce shall in all other aspects comply with the requirements of the legislations currently in force in Malaysia.

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